

State: KERALA

Agriculture Contingency Plan for District: IDUKKI

1.0 District Agriculture profile					
1.1	Agro-Climatic/Ecological Zone				
	Agro Ecological Sub Region (ICAR)	Western Ghats And Coastal Plain, Hot Humid Region (19.2)			
	Agro-Climatic Region (Planning Commission)	Western Plain and Ghat Region (XII)			
	Agro Climatic Zone (NARP)	High altitude zone (KE-4)			
	List all the districts or part thereof falling under the NARP Zone	Idukki and Wyanad			
	Geographic coordinates of district	Latitude	Longitude	Altitude	
		9° 51 0 N	76° 56 24 E	600 m above MSL	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Cardamom Research Station, Pampadumpara			
	Mention the KVK located in the district	Bapooji KVK, Santhanpara P.O, Idukki- 685619 phone: 04868 247541			
1.2	Rainfall	Normal RF(mm)	Normal Rainy days (number)	Normal Onset	Normal Cessation
	SW monsoon (July-Sep 2008):	987.6	73	June 1 st week	Sep 1 st week
	NE Monsoon(Oct-Dec):	506.57	32	October 1 st week	November 3 rd week
	Winter (Jan- March)	85.54	6	-	-
	Summer (Apr-May)	203.6	16		
	Annual (Actual 08-09)	1783.31		-	-

1.3	Land use pattern of the district (latest statistics)	Geographical Area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area (ha)	436328	198413	11867	171	1460	178	2181	940	740

1.4	Major Soils (common names like shallow red soils etc.,)	Area ('000 ha)	Percent (%) of total
	1. Forest loam	210.280	48.19
	2. Laterite		
	3. Brown hydromorphic		
	4. Alluvial		
	Others (specify):		
1.5	Agricultural land use	Area ('000 ha)	Cropping intensity %
	Net sown area	229.65	
	Area sown more than once	60.18	
	Gross cropped area	289.84	

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	18.060		
	Gross irrigated area	7.246		
	Rainfed area	-		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		4.117	22
	Tanks		6.462	35
	Open wells		1.849	10
	Bore wells		0.190	1
	Lift irrigation			
	Minor irrigations		0.146	0.8
	Micro-irrigation			
	Other sources		5.296	29

Total Irrigated Area		18.060	
Pump sets			
No. of Tractors			
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) Area	
Over exploited	Nil		
Critical	one	95.75	
Semi- critical	Two	56.86	
Safe	Five	36.50	
Wastewater availability and use			
Ground water quality	Good		

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

1.7 Area under major field crops & horticulture etc. (2008-09)

1.7	Major Field Crops cultivated	Area (ha)					
		Kharif		Rabi		Summer	Total
		Irrigated	Rainfed	Irrigated	Rainfed		
	Tapioca	1189		4136		2381	7706
	Sugarcane			2298			2487
	Rice	494		1561	3	57	2115
	Ragi						5
	Other cereals						26
	Horticulture crops - Fruits	Total area		Irrigated			
	Jack	11171					
	Mango	5054					
	Plantain	3390					
	Banana	2705		923			
	Pineapple	1008					
	Horticultural crops - Vegetables	Total area		Irrigated			
	Drumstick	488		296			
	Bitter gourd	480		480			

	Green chillies	52	52
	Amaranthus	46	46
	Medicinal and Aromatic crops	Total area ('000 ha)	Irrigated ('000 ha)
	Pepper	58.2	23.3
	Cardamom	33.0	33.0
	Nutmeg	2.5	0.1
	Vanilla	0.9	
	Clove	0.7	
	Ginger	0.6	
	Tamarind	0.3	
	Turmeric	0.2	

	Plantation crops	Total area	Irrigated
	Rubber	39.3	
	Coconut	17.7	0.7
	Coffee	12.6	
	Cocoa	10.2	
	Arecanut	3.1	0.1
	Cashew	1.3	
	Fodder crops	Total area	Irrigated
	Fodder grass	1.8	
	Green Manure	1.2	
	Total fodder crop area		
	Grazing land		
	Sericulture etc		
	Others (Specify)		

1.8	Livestock	Male ('000)	Female ('000)	Total ('000)		
	Non descriptive Cattle (local low yielding)	10.62	59.51			
	Crossbred cattle	21.78	158.93			
	Non descriptive Buffaloes (local low yielding)	3.192	11.401			
	Graded Buffaloes	Nil				
	Goat	38.57	136.43			
	Sheep			0.161		
	Others (Pig)			14.78		
	Commercial dairy farms (Number)					
1.9	Poultry	No. of farms	Total No. of birds ('000)			
	Commercial		413.09			
	Backyard					
1.10	Fisheries (Data source: Chief Planning Officer)					
	A. Capture					
	i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets	Storage facilities (Ice plants etc.)
			Mechanized	Non-mechanized		
	ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks
		554		18		Nil
	B. Culture					
		Water Spread Area (ha)		Yield (t/ha)		Production ('000 tons)

	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	NIL		
	ii) Fresh water (Data Source: Fisheries Department)	266	2.5	0.732

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08)

1.11	Name of crop	Kharif		Rabi		Summer		Total		Crop residue as fodder ('000 tons)
		Production ('t)	Productivity (kg/ha)	Production ('t)	Productivity (kg/ha)	Production ('t)	Productivity (kg/ha)	Production ('t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Rice	1968	2071	4501	2066	380	2071	6848	2069	
	Tapioca							23169	25947	
	Sugarcane							9733	7.69	
Major Horticultural crops (Crops to be identified based on total acreage)										
	Jack							29 million nos	2416 no/ha	
	Pepper							33234	337	
	Cardamom							7826	236	
	Coffee							6913	617	
	Plantain							30969	7013	
	Banana							16478	6220	
	Tea							36658	1513	
	Ginger							2873	3.39	
	Turmeric							650	2.03	

1.12	Sowing window for 5 major field crops (start and end of normal sowing period)	Data Not Available				
	Kharif- Rainfed					
	Kharif-Irrigated					
	Rabi- Rainfed					
	Rabi-Irrigated					

1.13	What is the major contingency the district is prone to? (Tick mark and mention years if known during the last 10 year period)	Regular	Occasional	None
	Drought		✓	
	Flood		✓	
	Cyclone		✓	
	Hail storm		✓	
	Heat wave			✓
	Cold wave			✓
	Frost			✓
	Sea water intrusion			✓
	Pests and diseases (specify)	✓		
	Coconut Mite	✓		
	Coconut Yellowing	✓		
	Others	✓		
	Land slide			

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 2 weeks (June 3 rd week)	Manakkad series Gravelly Sandy clay –clay loam soils	Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber.	Mulching Bulk organic manuring Sprinkler Irrigation	Micro irrigation Scheme, RKVY, NREGS
	Thommankuthu series Clay loam to gravelly clay loam soils	Forest Vegetation, Rubber, Coconut	-do-	
	Chinnar series Sandy loam to Sandy clay loam soils	Forest Vegetation, Tea	Coir pith mulching For tea	
	Venmani Series Loam to clay loam soils	Coconut based mixed cropping with Pepper, Arecanut, Tapioca, Cocoa, Coffee, Turmeric, ginger and rubber	Mulching Bulk organic manuring Sprinkler Irrigation	Micro irrigation Scheme, RKVY, NREGS
	Pampadumpara Series Silty clay to clay soils	Cardamom, Coffee, Pepper	Mulching Bulk organic manuring Sprinkler Irrigation	Micro irrigation Scheme, RKVY, NREGS
	Anamudi Series Silty loam to clay loam soils	Forest vegetation, Tea	Coir pith mulching For tea	

Condition				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 4 weeks (july 1st week)	Manakkad series Gravelly Sandy clay –clay loam soils	Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber.	Mulching, Bulk organic manuring, Sprinkler Irrigation Collection and conservation of rainwater, De silting, repairing and renovation of irrigation channels.	RKVY, NREGS
	Thommankuthu series Clay loam to gravelly clay loam soils	Forest Vegetation, Rubber, Coconut	Mulching, Bulk organic manuring, Cover cropping, Husk Burial	CDB
	Chinnar series Sandy loam to Sandy clay loam soils	Forest Vegetation, Tea	Coir pith mulching For tea	
	Venmani Series Loam to clay loam soils	Coconut based mixed cropping with Pepper, Arecanut, Tapioca, Cocoa, Coffee, Turmeric, ginger and rubber	Mulching, Bulk organic manuring, Sprinkler Irrigation Collection and conservation of rainwater, De silting, repairing and renovation of irrigation channels. Cover crops for rubber	RKVY, NREGS
	Pampadumpara Series Silty clay to clay soils	Cardamom, Coffee, Pepper	Mulching, Bulk organic manuring, Sprinkler Irrigation Collection and conservation of rainwater, De silting, repairing and renovation of irrigation channels	RKVY
	Anamudi Series Silty loam to clay loam soils	Forest vegetation, Tea	Coir pith mulching For tea	

Condition				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 6 weeks (July 3 rd week)	Not Applicable			

Condition				
Early season drought (delayed onset)	Major Farming situation	Normal Crop/cropping system	Agronomic measures	Remarks on Implementation
Delay by 8 weeks (August 1st week)	Not Applicable			

Condition	Major Farming situation	Normal Crop/cropping system	Crop management	Soil nutrient & moisture conservation measures	Remarks on Implementation
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period) At vegetative stage	<p>Manakkad series –gravelly Sandy clay loam To clay loam</p> <p>Thommankuthu series Clay loam to gravelly clay loam</p> <p>Chinnar series Sandy loam to Sandy clay loam</p> <p>Venmany Series Loam to clay</p> <p>Pampadumpara Series Silty clay to clay</p> <p>Anamudi Series Silty loam to clay loam</p>	<p>Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber. Forest Vegetation, Rubber, Coconut Forest Vegetation, Tea</p> <p>Coconut based mixed cropping with Pepper, Arecanut, Tapioca, Cocoa, Coffee, Turmeric, Ginger and Rubber</p> <p>Cardamom, Coffee, Pepper</p> <p>Forest vegetation, Tea</p>	<p>Providing shade net for cardamom. Establishment of leguminous cover crop, Provide Shade to the young plants, white washing the main stem, Antitranspirant spray,</p>	<p>Zero tillage, Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Mist irrigation, Terracing, Husk burial, leaf cutting.</p>	

	<p>Manakkad series Sandy clay loam</p> <p>Thommankuthu series - Gravelly loam to gravelly clay</p> <p>Chinnar series Sandy loam to Sandy clay</p> <p>Venmany Series Loam to clay</p> <p>Pampadumpara Series Silty clay to clay</p> <p>Anamudi Series Silty loam to clay loam</p>	<p>Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber. Forest Vegetation</p> <p>Forest Vegetation, Tea</p> <p>Coconut based mixed cropping with Pepper, Arecanut, Tapioca, Cocoa, Coffee, Turmeric, ginger and rubber</p> <p>Cardamom, Coffee, Pepper</p> <p>Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber.</p>	<p>Sprinkler irrigation (especially for coffee and pepper), Mist irrigation for cardamom. Avoid trashing, Providing Shade nets (Cardamom), Antitranspirant spray,</p>	<p>Mulching, Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Terracing,</p>	
Terminal drought	<p>Manakkad series Sandy clay loam</p> <p>Thommankuthu series - Gravelly loam to gravelly clay</p> <p>Chinnar series Sandy loam to Sandy clay Venmany Series Loam to clay</p> <p>Pampadumpara Series Silty clay to clay</p> <p>Anamudi Series Silty loam to clay loam</p>	<p>Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber. Forest Vegetation</p> <p>Forest Vegetation, Tea</p> <p>Coconut based mixed cropping with Pepper, Arecanut, Tapioca, Cocoa, Coffee, Turmeric, ginger and rubber</p> <p>Cardamom, Coffee, Pepper</p> <p>Coconut based mixed cropping with Pepper, Pineapple, Tapioca and rubber.</p>	<p>Establishment of leguminous cover crop, Shading, Pruning of coffee, Antitranspirant spray,</p>	<p>Sub-surface storing of ground water, Less exploitation of ground water, Drip irrigation, Mist irrigation, Terracing, Husk burial, leaf cutting.</p>	

2.1.2 Irrigated situation

Condition	Major Farming situation	Normal Crop/cropping system	Suggested Contingency measures		
			Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Insufficient groundwater recharge due to low rainfall	Pampadumpara Series Silty clay to clay	Cardamom, Coffee, Pepper	No Change	Check Dams, Percolation Pits, Rain water harvesting structures. Water conservation Measures.	RKVY

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition	Suggested contingency measures			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Cardamom	Improve drainage facility, Cover crops, Strip cropping with fodder grasses, Collection and conservation of rainwater,			Improve storage facility/godowns
Pepper				
Coffee				
Coconut				
Heavy rainfall with high speed winds in a short span				
Cardamom	Propping of banana plants, Improve drainage facility, shelter belts,			Improve storage facility/godowns
Pepper				
Coffee				

Coconut				
Condition	Suggested contingency measure			
Outbreak of pests and diseases due to unseasonal rains	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Horticulture				Improve storage facility
Coffee	Remove dead leaves and twigs which harbor the resting stage of the fungus, Provide proper drainage and spray 1 % BM before the onset of monsoon, Prune the affected branches and protect the new shoots and berry stalks with 0.5% BM, Proper shade regulation to avoid sun scalding.			
Pepper	Remove and burn all infected plant debris and dead vines along with root system to reduce the build up of the inoculums in the field. Prune the runner shoots or tie back to vines before the onset of monsoon. Prune off the leaves and shoots of vines to a height of 2 feet from the soil. Application of bio-control agents.			
Banana	Remove and destroy severely infected and completely dried leaves, Use disease free healthy planting material. Avoid any sort of root injury through intercultural operations or by nematode infestation, Provide better drainage,			
Arecanut	Grow cover crops in the garden and apply <i>in situ</i> . Avoid water stagnation in the garden by providing drainage facilities. Prophylactic spray of 1% Bordeaux mixture with stickers once before the onset of south west monsoon followed by second and third applications at 40-45 days interval. Collect and destroy all fallen and infected nuts.			

Condition	Suggested contingency measure	
Continuous high rainfall in a short span leading to water logging		Post harvest
Horticulture	Improve drainage facility,	-

Cardamom		
Tea		
Coffee		
Pepper		
Rubber		
Heavy rainfall with high speed winds in a short span	Improve drainage facility, Proper shading (Shelter belt)	
Horticulture		
Cardamom		
Tea		
Coffee		
Pepper		
Outbreak of pests and diseases due to unseasonal rains		
Cardamom	Trashing , Proper drainage and spray 1 % Bordeaux mixture with sticker, and drenching with CoC 0.3%,	
Tea	Pruning, spray 1 % Bordeaux mixture with sticker	
Coffee	Remove dead leaves and twigs which harbour the resting stage of the fungus, Provide proper drainage and spray 1 % BM before the onset of monsoon, Prune the affected branches and protect the new shoots and berry stalks with 0.5% BM, Proper shade regulation to avoid sun scalding.	
Pepper		

2.3 Land Slides

Condition	Suggested contingency measures			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Transient water logging/ partial inundation				
Cardamom	Avoid felling of trees in cardamom plantations. Planting of shade trees, Avoid excessive soil alterations along road sides. Fencing using local tree species. Soil and water conservation measures. Avoid rock blasting in flood prone areas. Weather based crop insurance scheme must be introduced to all crops. Pits taking in contours and mountain valley to be discourage, cover crop raising in plantation sector. Weather forecasting			
Coffee				
Pepper				
Tea				

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	During the event	After the event
Drought			
Feed and fodder availability	<ol style="list-style-type: none"> 1.Conserving fodder/crop residues/ forest grass by silage / hay making either by individual or on community basis 2. Preparing complete diets and storing in strategic locations 3. Organize procurement of dry foddors / feed ingredients from surplus areas 4. Establish fodder banks and feed banks 5. Capacity building and preparedness 	<ol style="list-style-type: none"> 1.Organise relief camps 2.Supply silage / hay to farmers with productive stock on subsidized rates 3.Segregate old, weak and unproductive stock and send for slaughter 4. Supply mineral mixture to avoid deficiencies 5. Dry fodder must be offered to the livestock in little quantities for number of times 6.Concentrate feed or complete feed must be offered to only productive and young stock only 	<ol style="list-style-type: none"> 1. Capacity building to stake holders on drought /cyclone/flood mitigation 2. Promote fodder cultivation. 3. Flushing the stock to recoup 4. Avoid soaked and mould infected feeds / foddors to livestock 5. Replenish the feed and fodder banks 6.Promote fodder preservation techniques like silage / hay making
Drinking water	<ol style="list-style-type: none"> 1.Plan for sufficient number of tanks for water transportation 2. Identify bore wells, which can sustain demand. 3.Procure sufficient quantities of water Sanitizers 	<ol style="list-style-type: none"> 1.Regular supply of clean drinking water to all tanks 2.Cleaning the tanks in regular intervals 2.Add water sanitizers 	<ol style="list-style-type: none"> 1.Rain water Harvesting should be done

Health and disease management	<ol style="list-style-type: none"> 1. Procure and stock emergency medicines and vaccines for important endemic diseases of the area 2. All the stock must be immunized for endemic diseases of the area 3. Carry out deworming to all young stock 4. Keep stock of bleaching powder and lime 5. Identify the Clinical staff and trained paravets and indent for their services as per schedules 7. Identify the volunteers who can serve in need of emergency 	<ol style="list-style-type: none"> 1. Keep close watch on the health of the stock 2. Sick animals must be isolated and treated Separately. 3. Carry out deworming and spraying to all animals entering into relief camps 4. Clean the animal houses regularly and apply disinfectants. 5. Safe and hygienic disposal of dead animal carcasses 6. Organize with community daily lifting of dung from relief camps 	<ol style="list-style-type: none"> 1. keep close surveillance on disease outbreak. 2. Undertake the vaccination depending on need 3. Keep the animal houses clean and spray disinfectants
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2.5.2 Poultry

	Suggested contingency measures			Convergence/linkages with ongoing programs, if any
	Before the event	During the event	After the event	
Drought				
Storage of feed ingredients	Storing of feed and ingredients	Provide kitchen waste and feed additives vitamin mineral mixtures	Cultivation of maize and other feed ingredients	Can be linked with ATMA, NREGS, RKVY
Drinking water	Storage of clean drinking water	Provide cold clean water	Digging of bore wells for drinking water	
Health and disease management	Vaccination of birds	Medicated water and Balanced feed should be given	Provide clean coops for shelter	

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought			
A. Capture	NA		
Marine	NA		

Inland			
(i) Shallow water depth due to insufficient rains/inflow	Stocking of advanced fingerlings in half or even less than the normal stocking density or stocking of common carp seed	Immediate harvesting or decreasing the density commensurate with the water quantity.	De weeding and deepening of tank to ensure retention of water for a longer period and provision of employment under MGNREGP
(ii) Changes in water quality	Regular monitoring of water quality parameters and application of geolites, soil probiotics, etc to maintain water quality	Immediate harvesting or changing the water quality by application of sanitisers.	Removal of top layer, deep ploughing of tank and application of lime
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	Crop holiday or going for stocking of yearlings by reducing the density according to availability of water	Harvesting of fish and leaving the pond fallow till next season	Removal of top layer, deep ploughing of tank and application of lime
(ii) Impact of salt load build up in ponds / change in water quality	NA		
2) Floods			
A. Capture			
Marine	NA		
Inland			
(i) Average compensation paid due to loss of human life	Shifting the people from low lying areas to relief camps	-	-
(ii) No. of boats / nets/damaged			
(iii) No.of houses damaged			
(iv) Loss of stock			
(v) Changes in water quality			

(vi) Health and diseases			
B. Aquaculture			
(i) Inundation with flood water	NA		
(ii) Water continuation and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			
3. Cyclone / Tsunami	NA		
A. Capture			
Marine			
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
4. Heat wave and cold wave	NA		
A. Capture			

Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			